

Standard Model of Matter

Sub Atomic Particles

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| <p>1. Baryons may have charges of</p> <ul style="list-style-type: none">1) $+1e$ and $+\frac{4}{3}e$2) $+2e$ and $+3e$3) $-1e$ and $+1e$4) $-2e$ and $-\frac{2}{3}e$ <p>2. What fundamental force holds quarks together to form particles such as protons and neutrons?</p> <ul style="list-style-type: none">1) electromagnetic force2) gravitational force3) strong force4) weak force <p>3. A top quark has an approximate charge of</p> <ul style="list-style-type: none">1) $-1.07 \times 10^{-19} \text{ C}$2) $-2.40 \times 10^{-19} \text{ C}$3) $+1.07 \times 10^{-19} \text{ C}$4) $+2.40 \times 10^{-19} \text{ C}$ <p>4. According to the Standard Model of Particle Physics, a meson is composed of</p> <ul style="list-style-type: none">1) a quark and a muon neutrino2) a quark and an antiquark3) three quarks4) a lepton and an antilepton <p>5. The tau neutrino, the muon neutrino, and the electron neutrino are all</p> <ul style="list-style-type: none">1) leptons2) hadrons3) baryons4) mesons | <p>6. A meson may <i>not</i> have a charge of</p> <ul style="list-style-type: none">1) $+1e$2) $+2e$3) $0e$4) $-1e$ <p>7. Protons and neutrons are examples of</p> <ul style="list-style-type: none">1) positrons2) baryons3) mesons4) quarks <p>8. Which of the following particles is NOT made of quarks?</p> <ul style="list-style-type: none">1) proton2) electron3) pion4) neutron <p>9. The omega (Ω) particle is made up of 3 strange quarks. It is</p> <ul style="list-style-type: none">1) a baryon with charge $+1 e$.2) a meson with charge $+1 e$.3) a baryon with charge $-1 e$.4) a meson with charge $-1 e$. <p>10. A baryon has a charge of $-1 e$. It CANNOT contain</p> <ul style="list-style-type: none">1) an up quark.2) a down quark.3) a charm quark.4) a bottom quark. |
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11. Which of the following happens in the production of beta radiation?

- 1) An up quark changes into a down quark.
- 2) A down quark changes into an up quark.
- 3) An up quark changes into a strange quark.
- 4) A down quark changes into a strange quark.

12. Which combination of quarks would produce a neutral baryon?

uud 1) $\bar{u}\bar{u}d$ 3)

udd 2) $\bar{u}dd$ 4)

13. A lithium atom consists of 3 protons, 4 neutrons, and 3 electrons. This atom contains a total of

- 1) 9 quarks and 7 leptons
- 2) 12 quarks and 6 leptons
- 3) 14 quarks and 3 leptons
- 4) 21 quarks and 3 leptons

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Answer Key

1. 3

2. 3

3. 3

4. 2

5. 1

6. 2

7. 2

8. 2

9. 3

10. 1

11. 2

12. 2

13. 4
